FIG.1

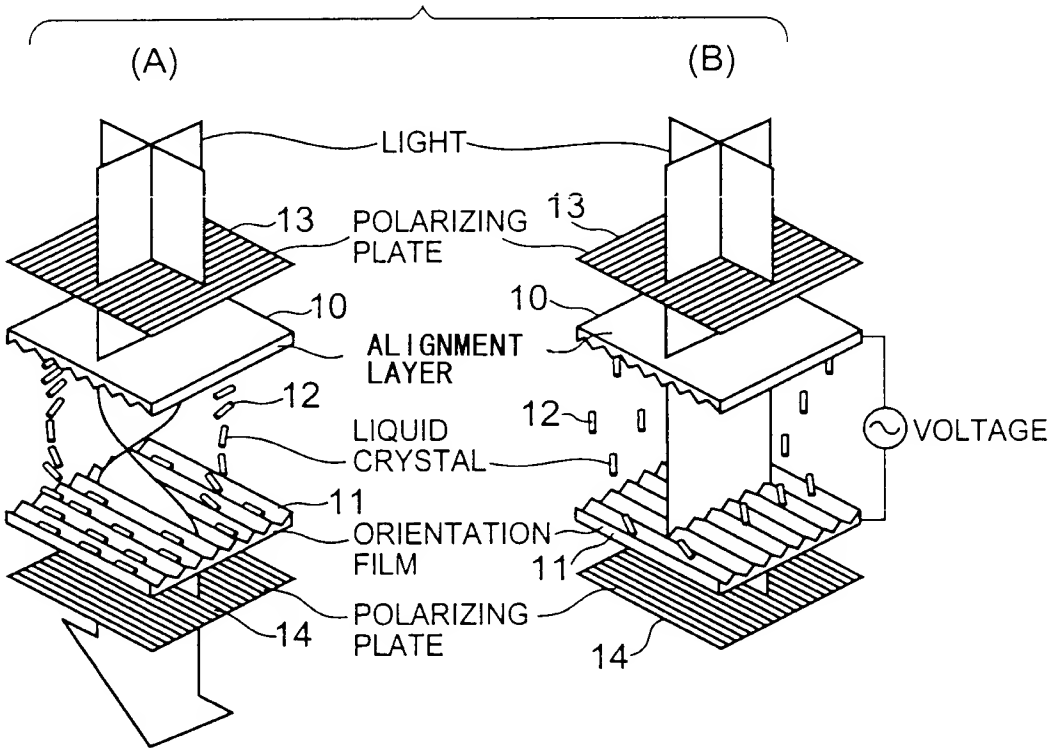

FIG.2

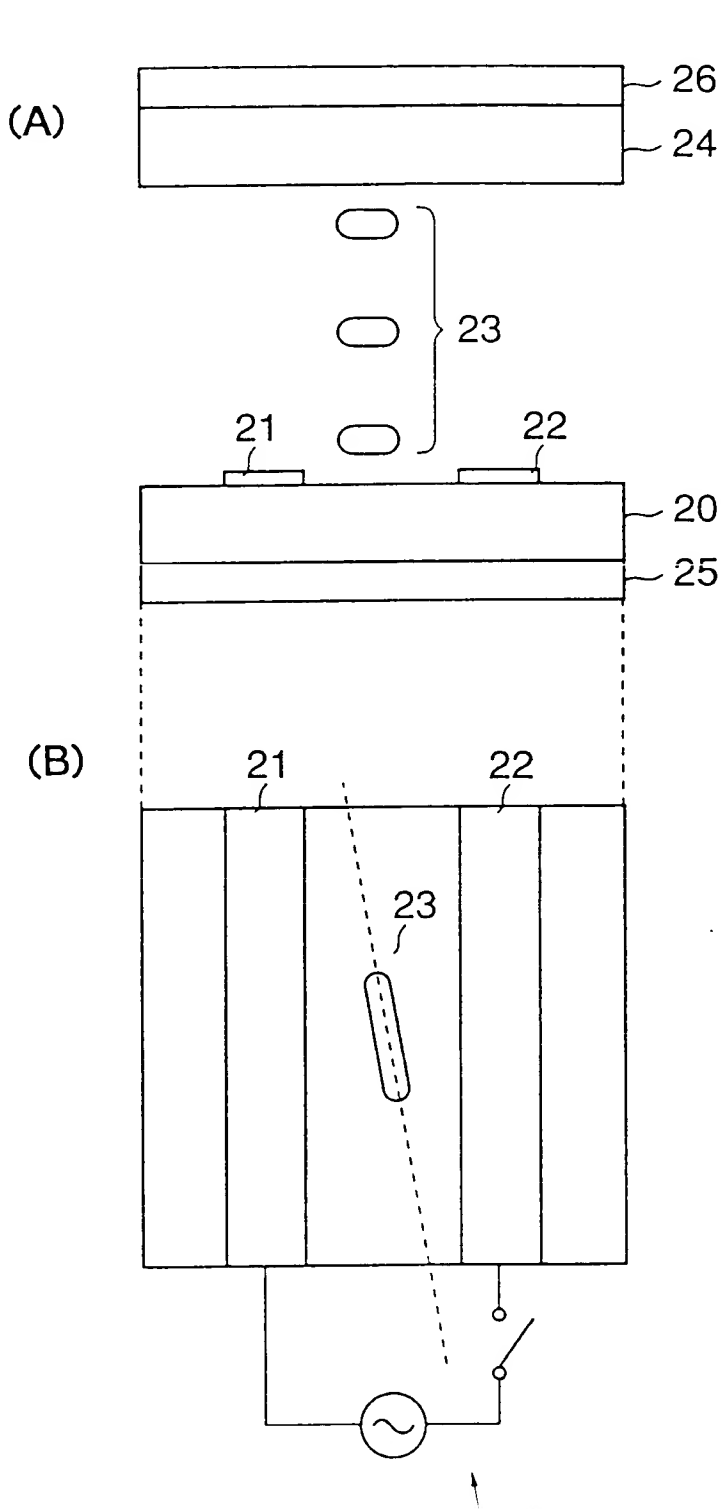

FIG.3

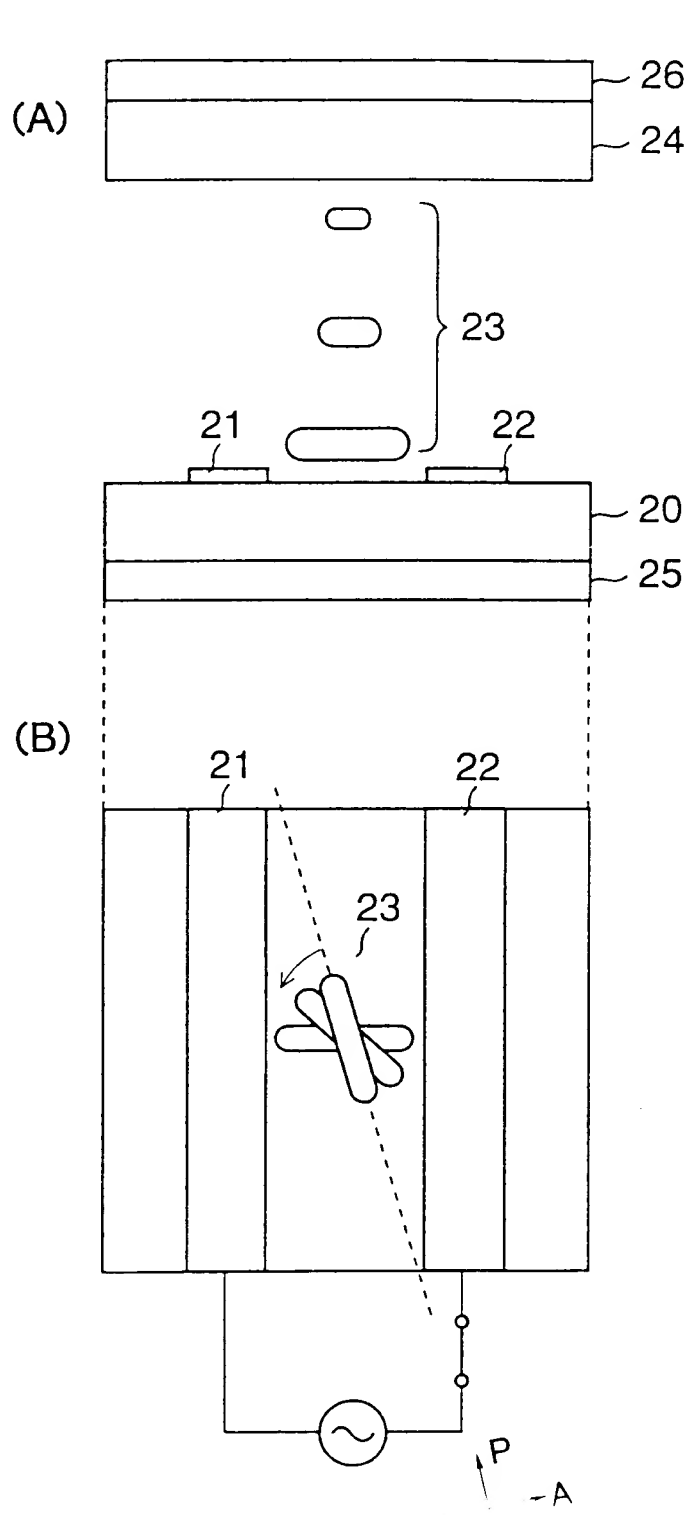

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FIG.4

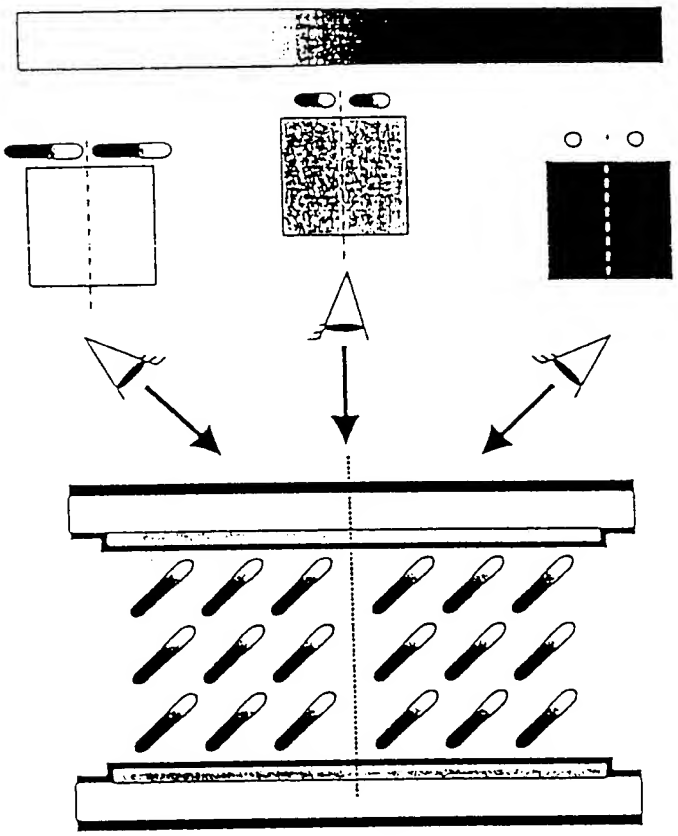

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FIG.5

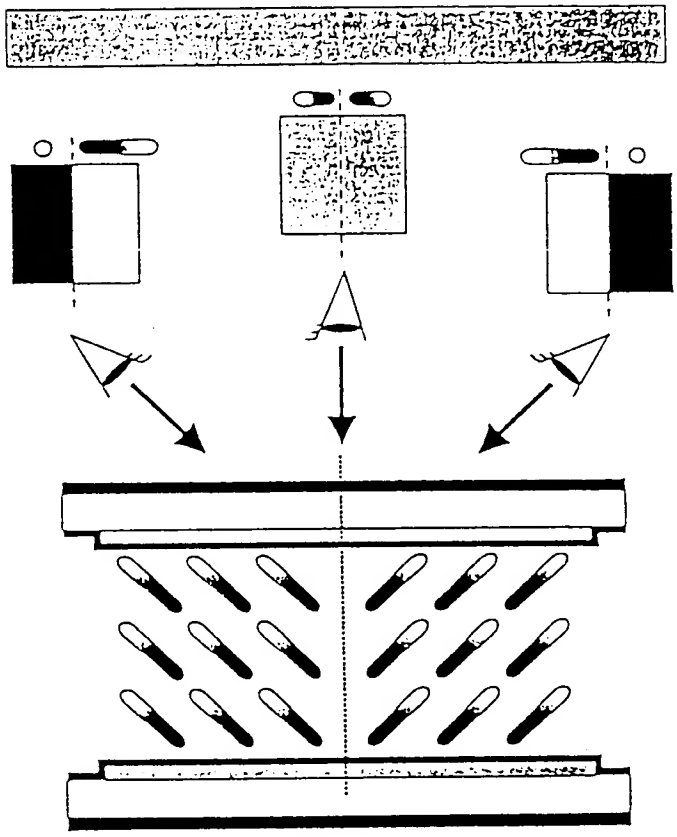


FIG.6

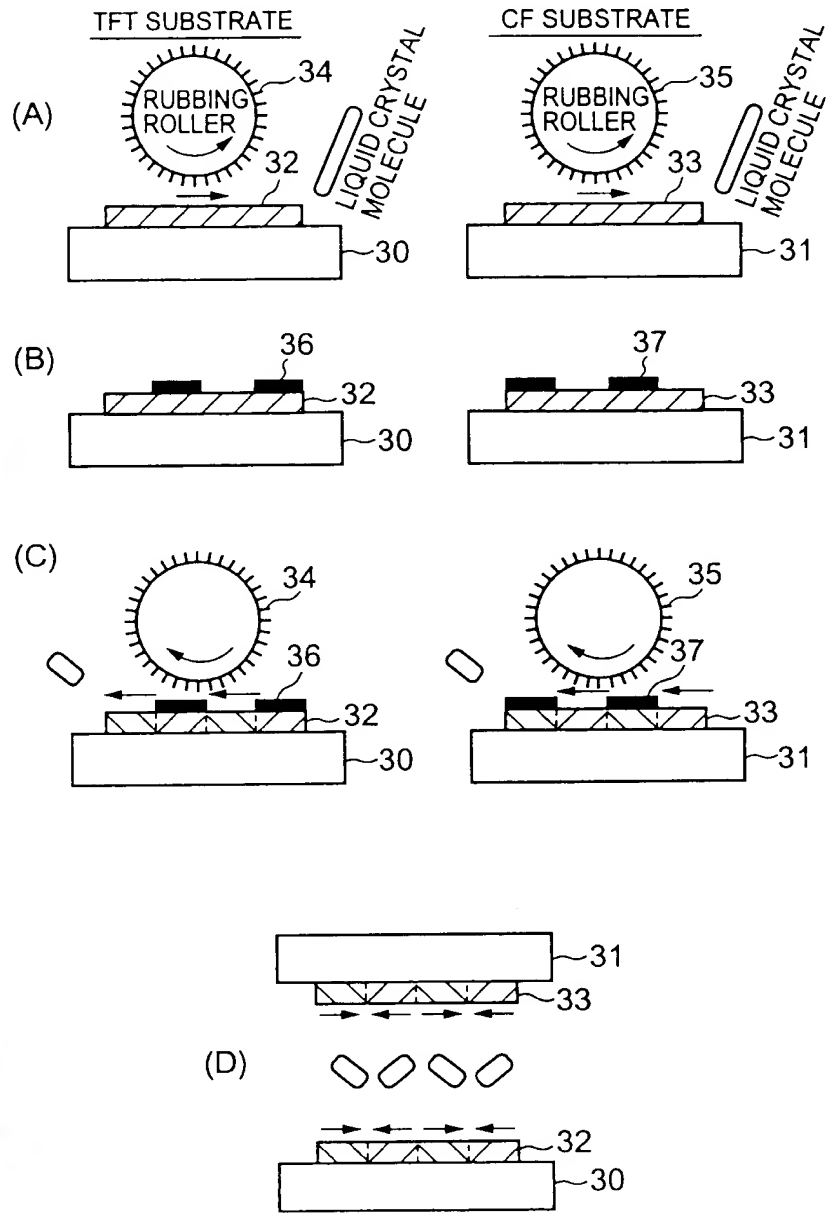


FIG.7

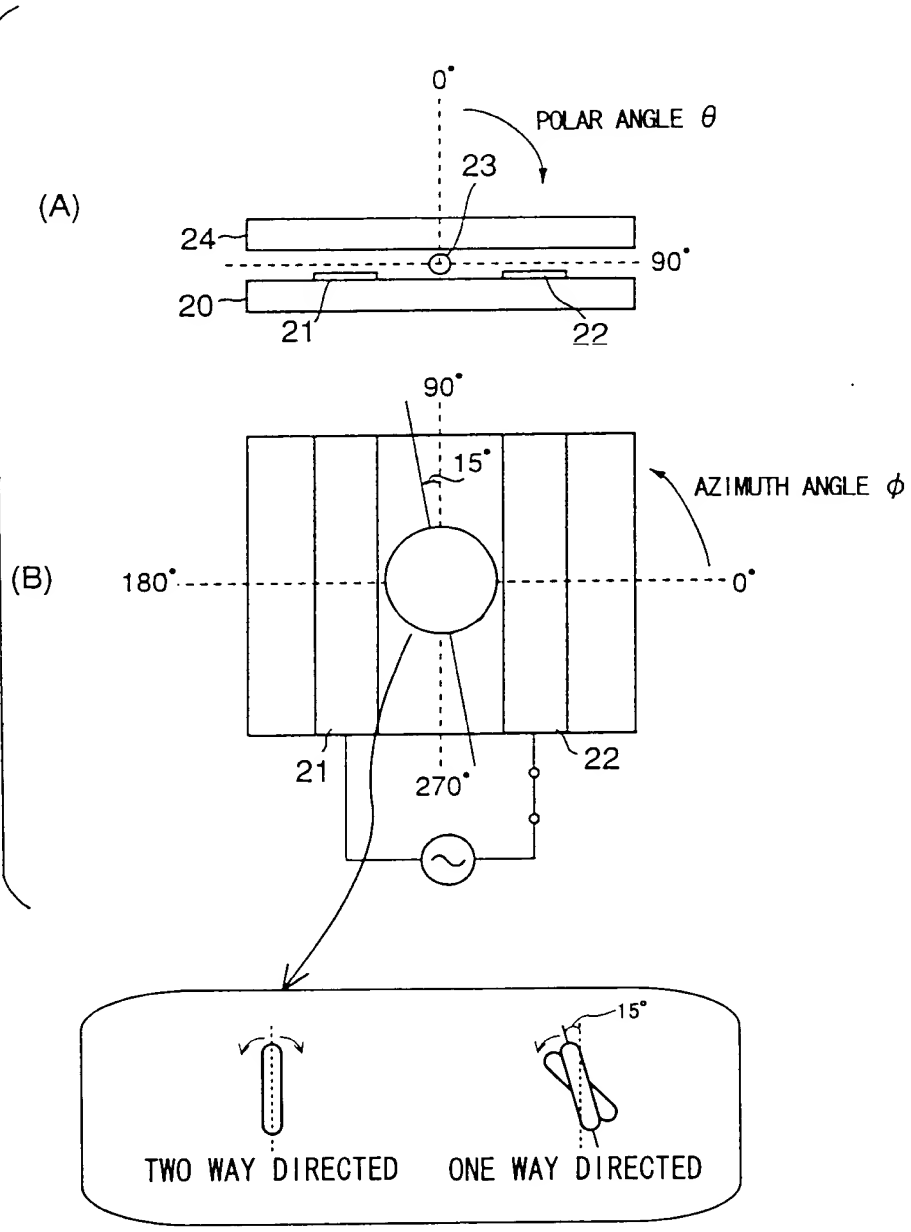
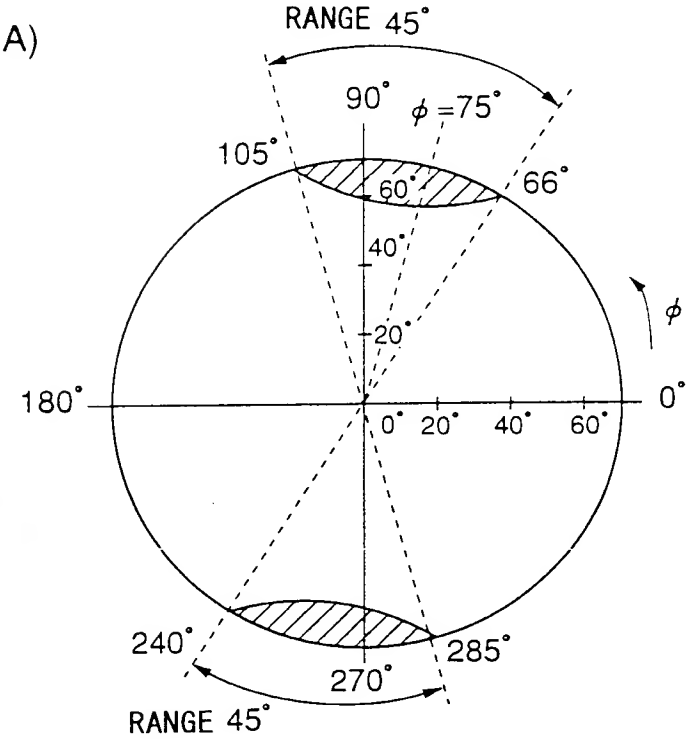

(A)
0°
POLAR ANGLE θ
23
24
90°
20
21
22
(B)
90°
15°
AZIMUTH ANGLE φ
180°
0°
21
270°
22
15°
TWO WAY DIRECTED
ONE WAY DIRECTED

FIG.8

(A)


RANGE 45°
90°
φ =75°
105°
66°
60°
40°
20°
φ
180°
0°
0° 20° 40° 60°
240°
285°
270°
RANGE 45°

(B)

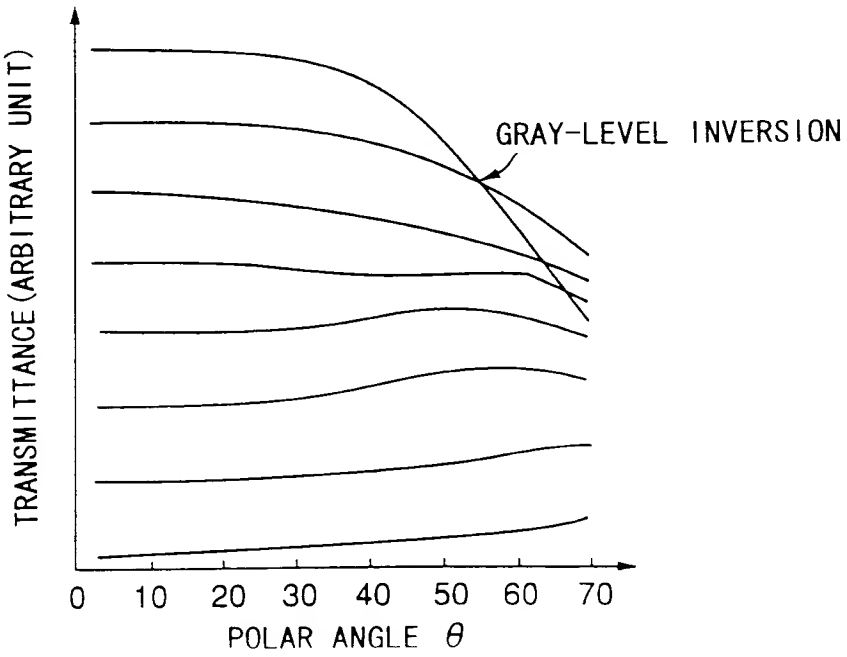

TRANSMITTANCE (ARBITRARY UNIT)
GRAY-LEVEL INVERSION
0 10 20 30 40 50 60 70
POLAR ANGLE θ

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FIG.9

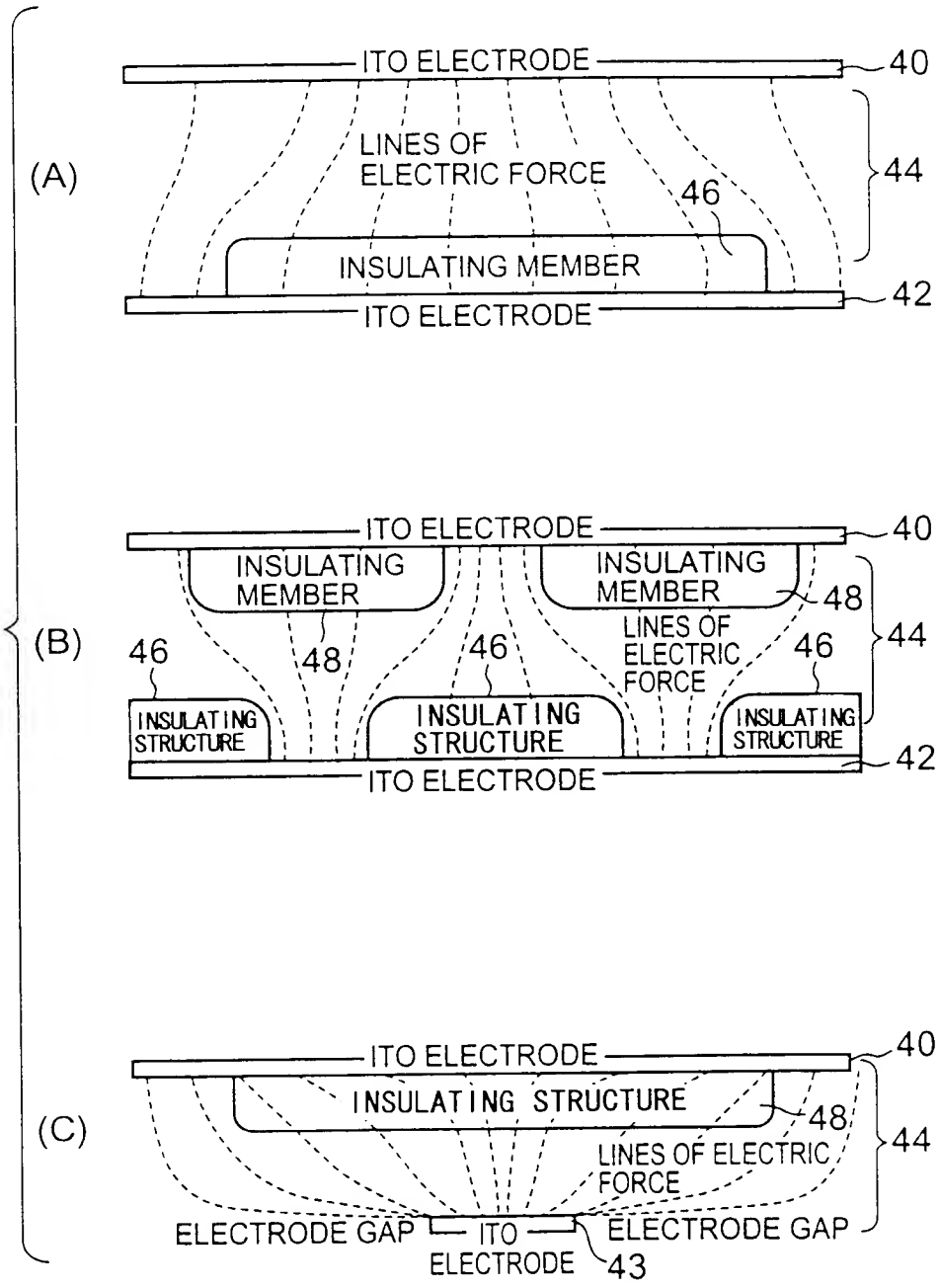

FIG.10

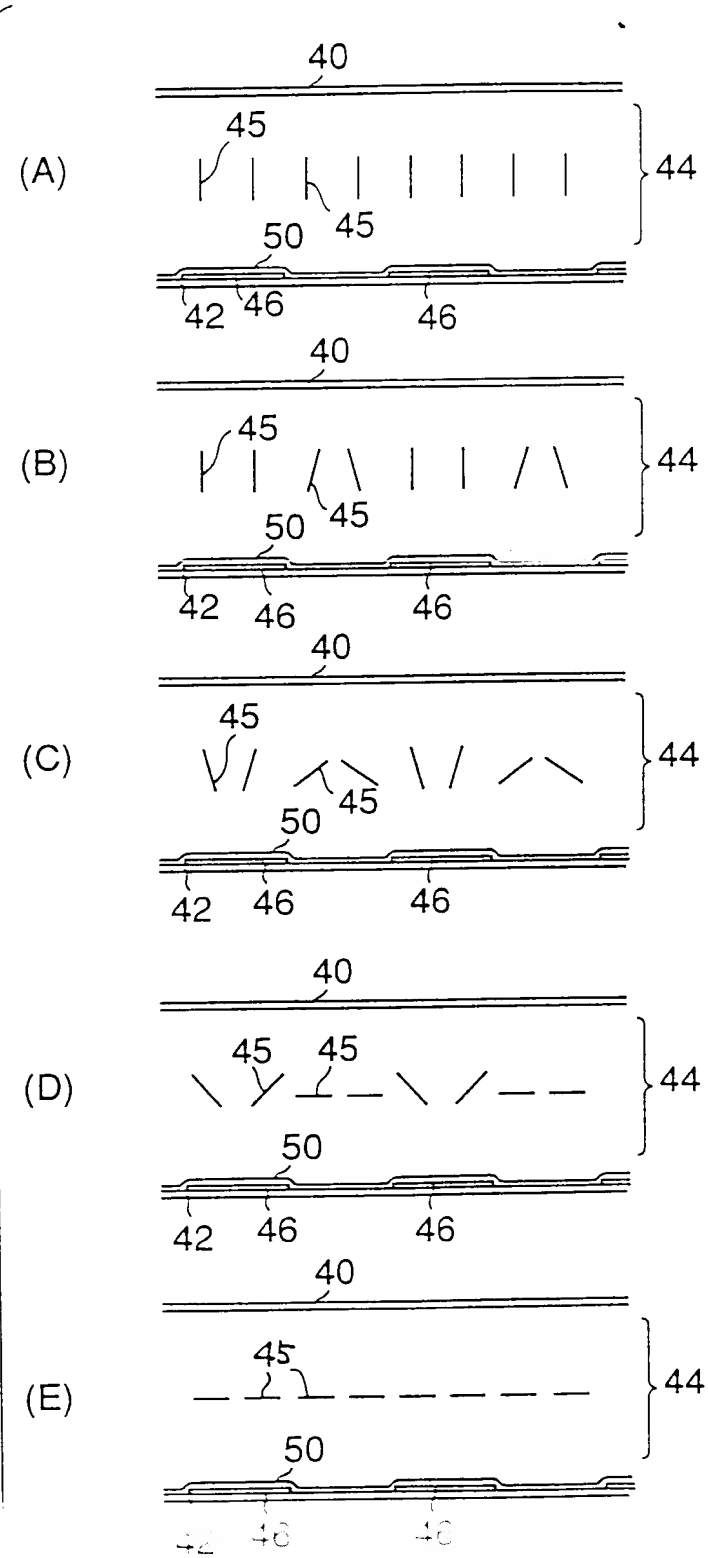
(A)
40
45
44
45
50
42
46
46
(B)
40
45
44
45
50
42
46
46
(C)
40
45
44
45
50
42
46
46
(D)
40
45
45
44
50
42
46
46
(E)
40
45
44
50
42
46
46

FIG.11

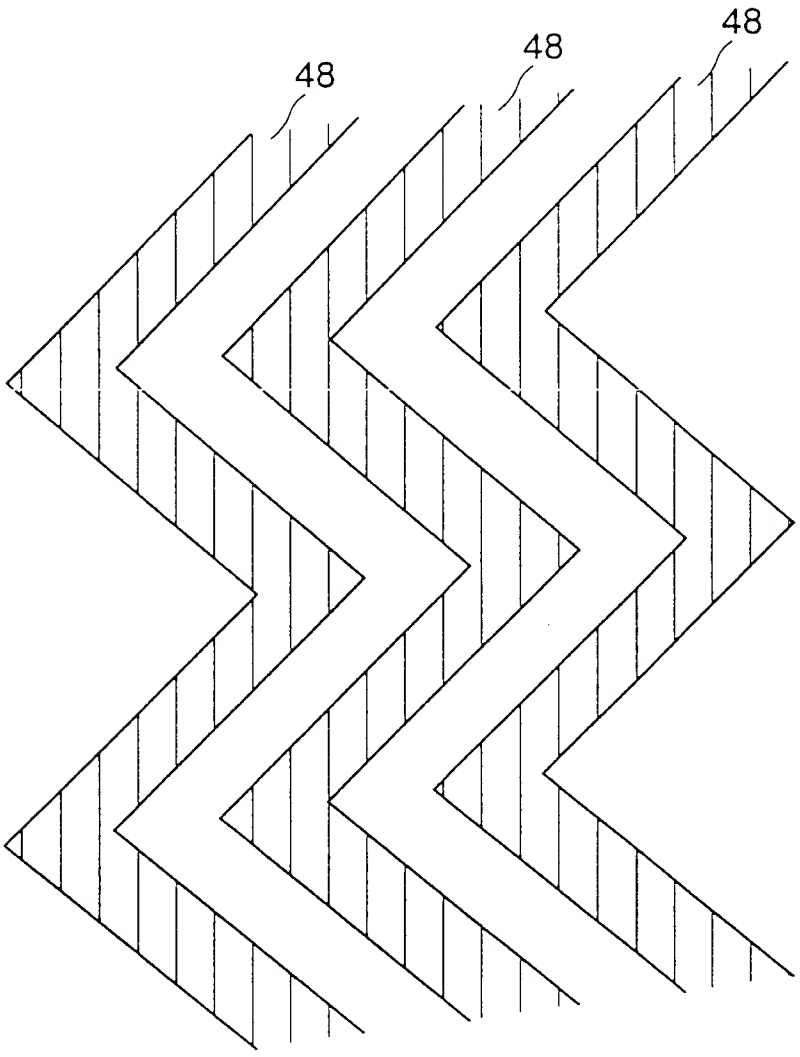

FIG.12

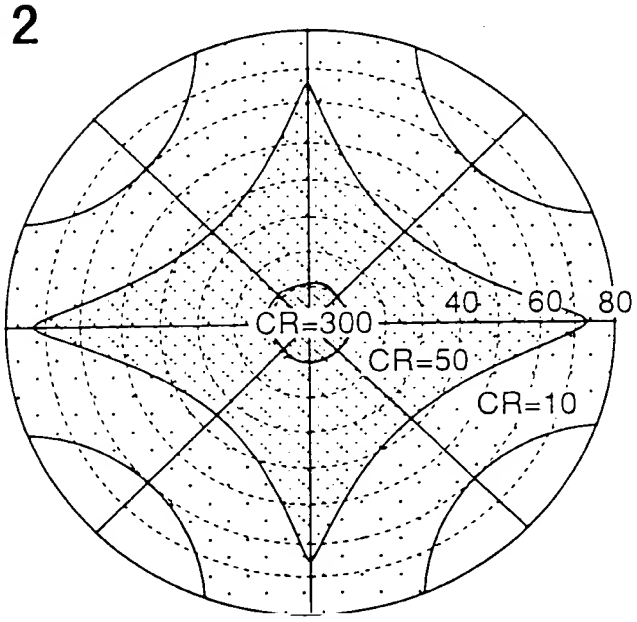

FIG.13

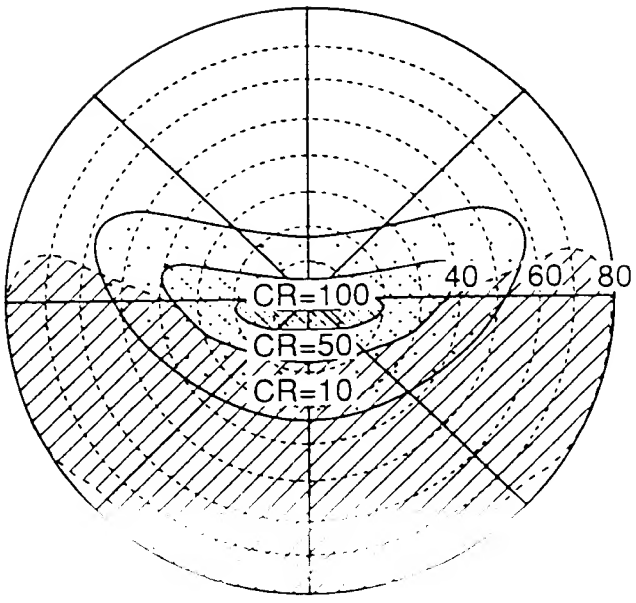

FIG.14

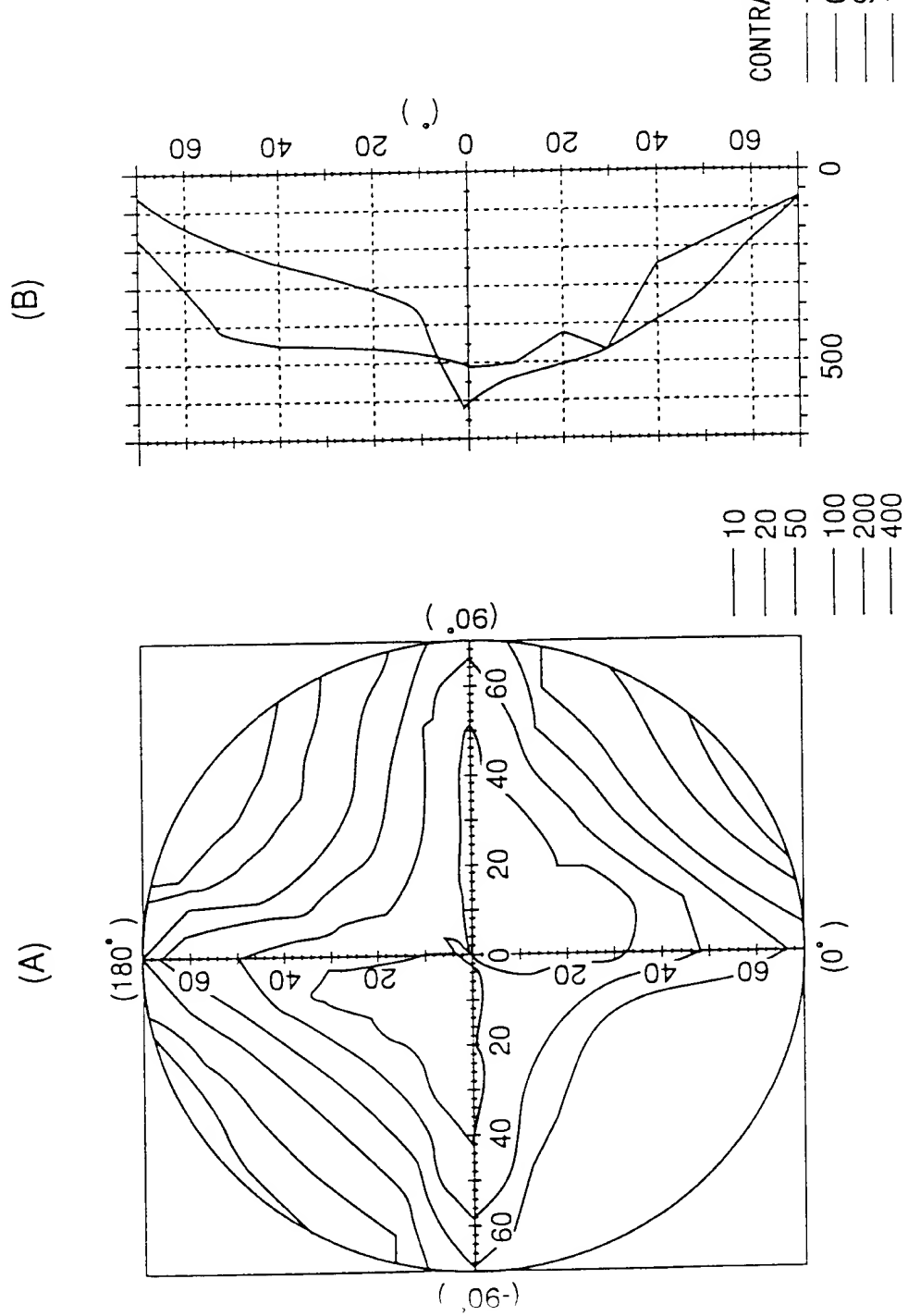
(A)
(B)
CONTRAST
-90°
0°
90°
188°
10
20
50
100
200
400
(90°)
(-90°)
(180°)
(0°)
0
20
40
60
500

FIG.15

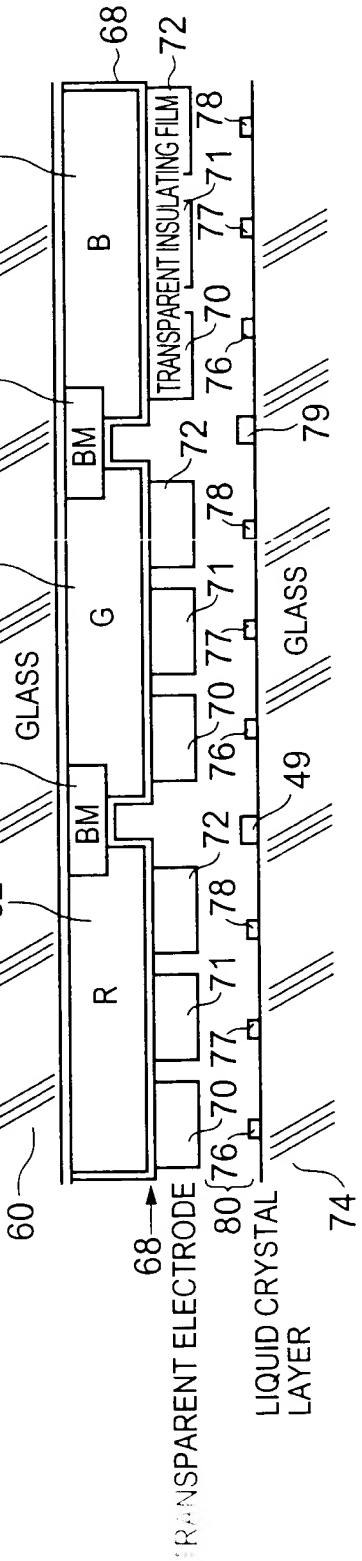
68
72
64
B
TRANSPARENT INSULATING FILM
78
71
77
70
76
66
BM
72
79
63
G
78
71
77
GLASS
70
76
66
BM
49
72
62
R
78
71
77
70
76
60
80
74
68
TRANSPARENT ELECTRODE
LIQUID CRYSTAL LAYER
GLASS

FIG.16

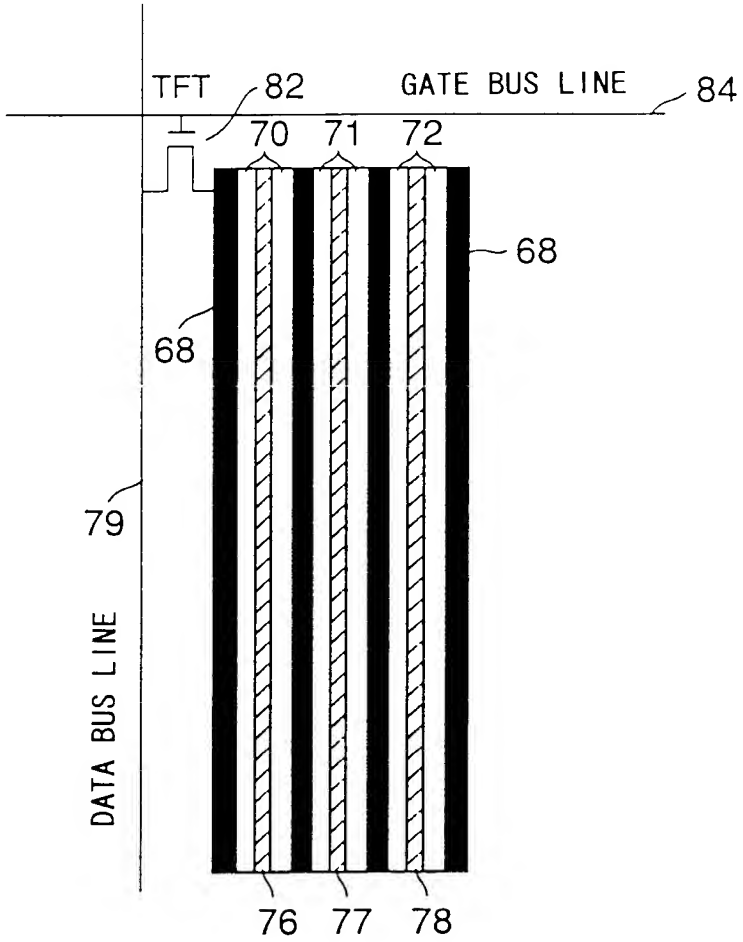

FIG.17

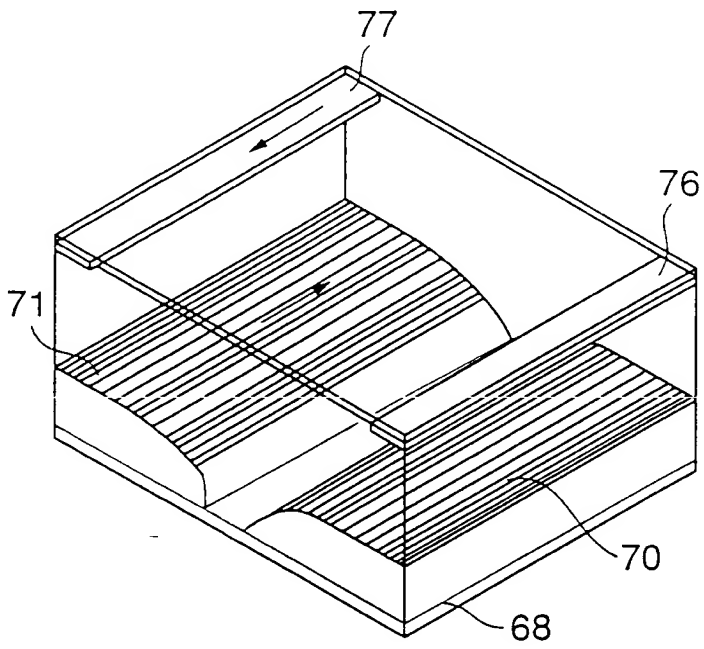

FIG.18

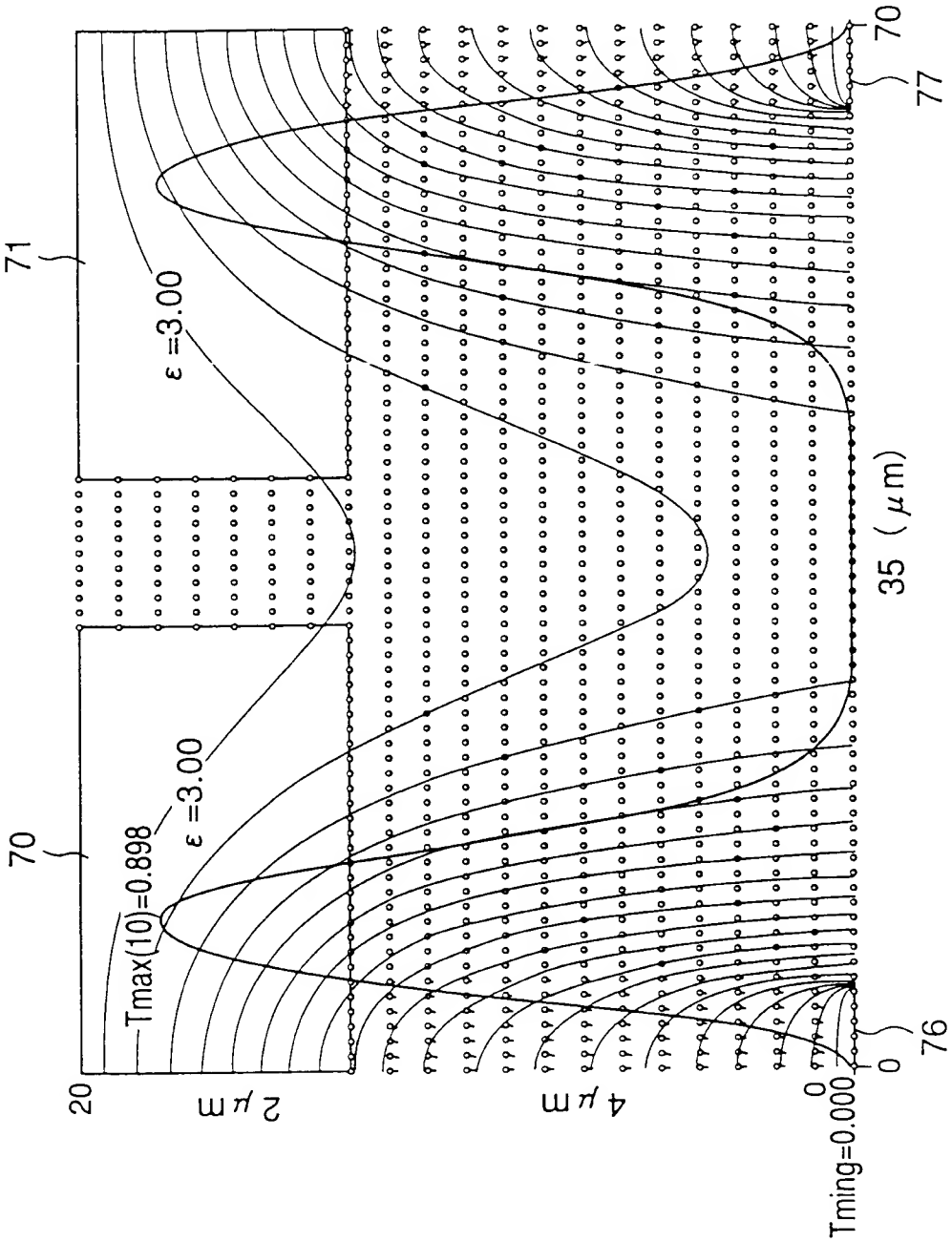

FIG.19

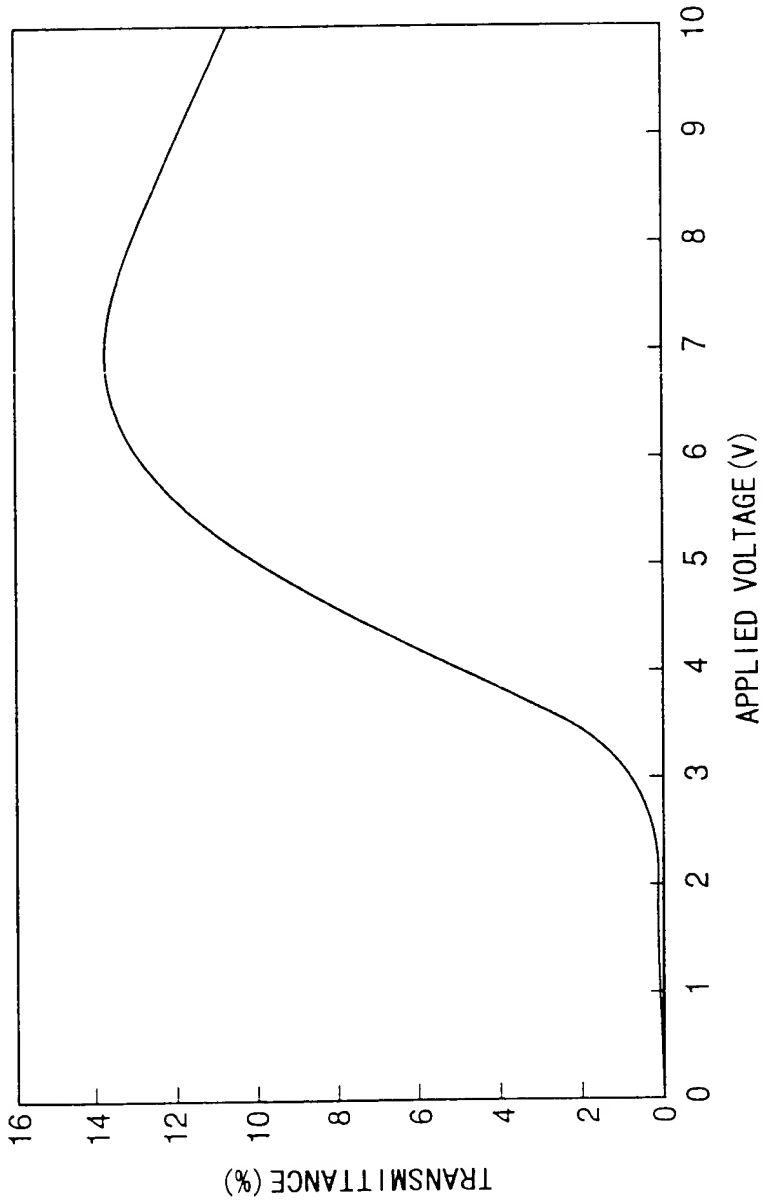
TRANSMITTANCE (%)
0
2
4
6
8
10
12
14
16
APPLIED VOLTAGE (V)
0
1
2
3
4
5
6
7
8
9
10

FIG.20

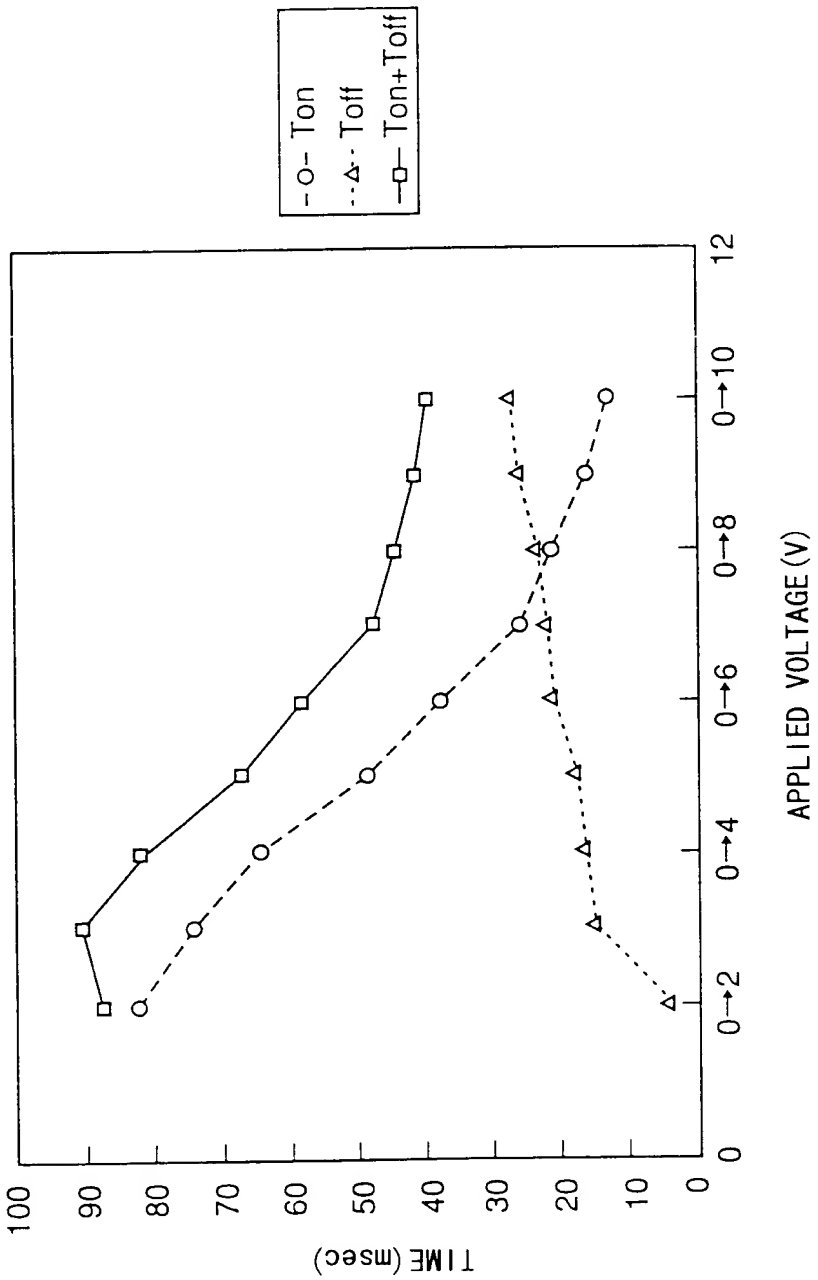

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FIG.21

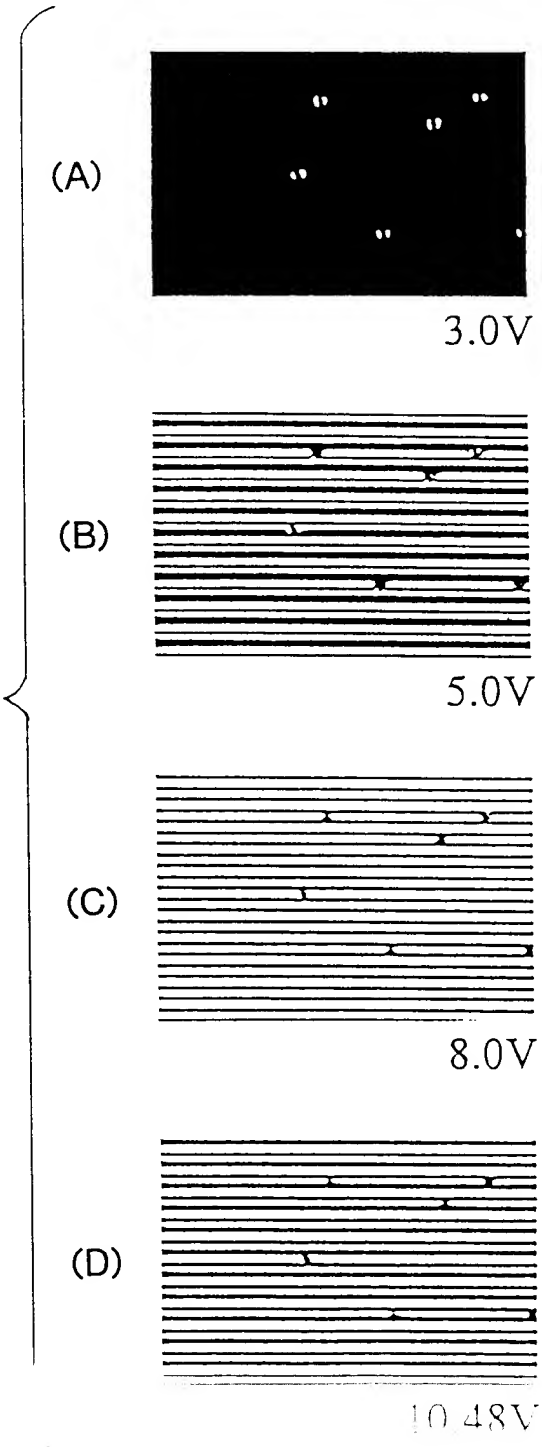

FIG.22

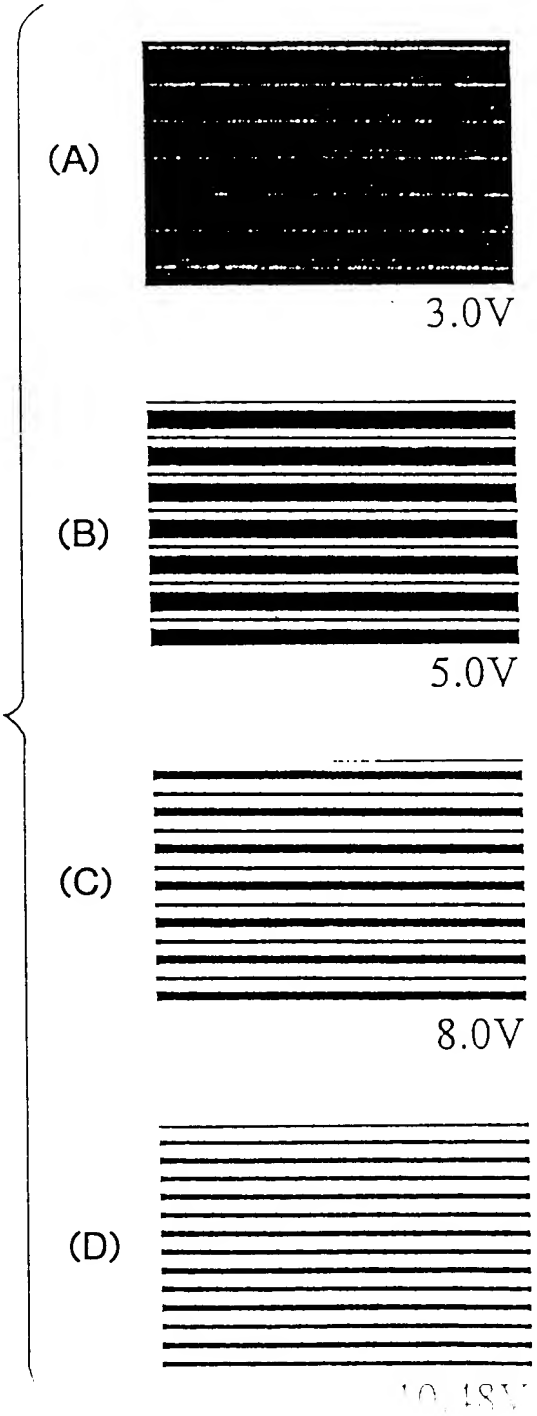

FIG.23

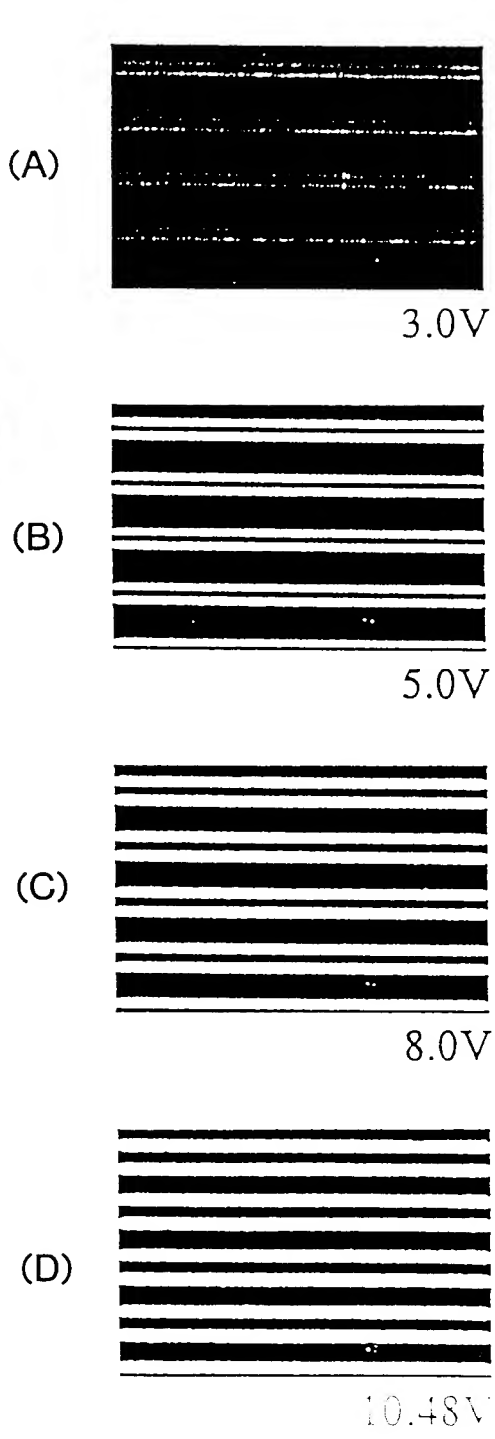

FIG.24

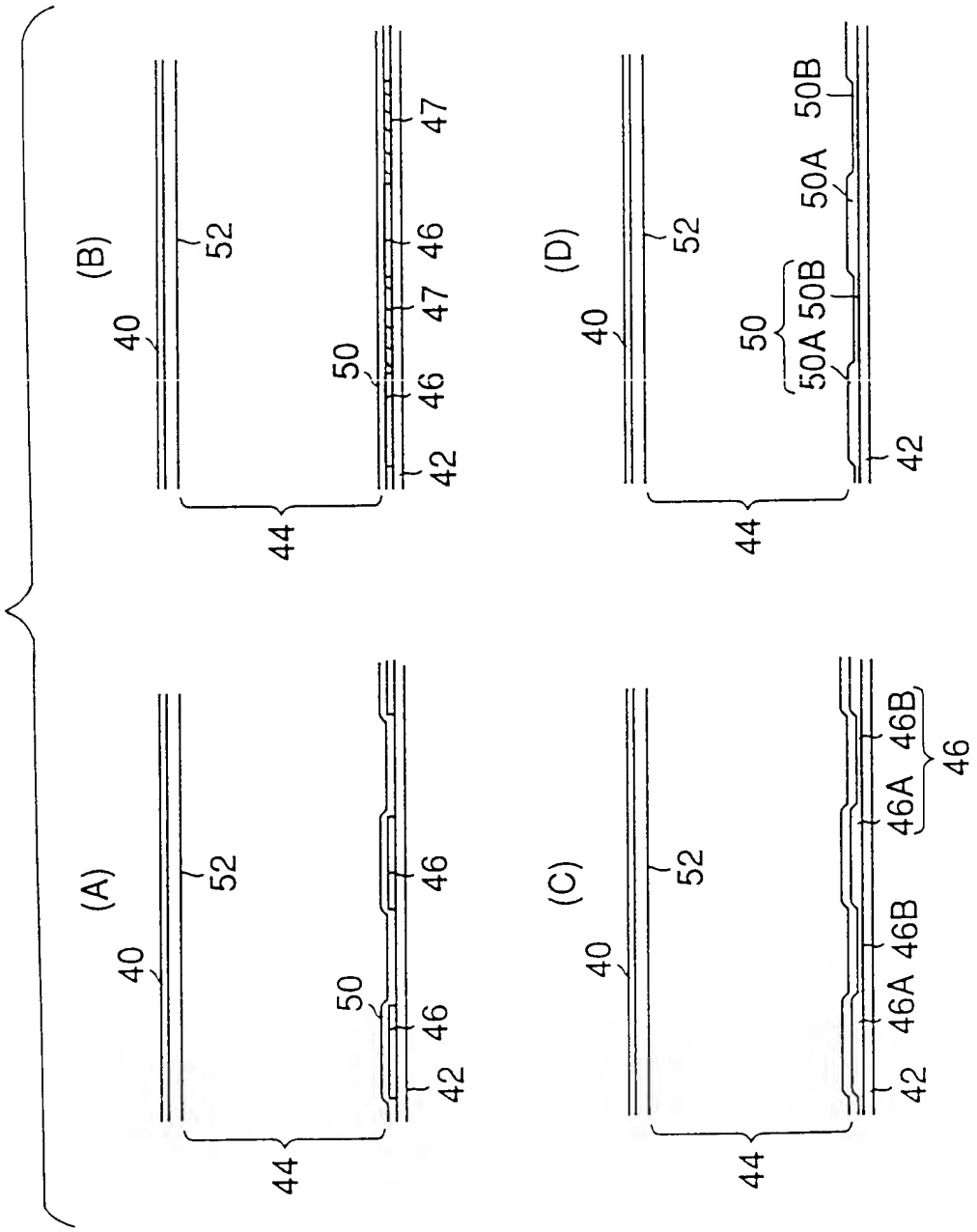
(A)
40
52
46
50
46
42
44
(B)
40
52
47
46
50
47
46
42
44
(C)
40
52
46
46A
46B
46
42
46A
46B
44
(D)
40
52
50
50A
50B
50A
50B
42
44

FIG.25

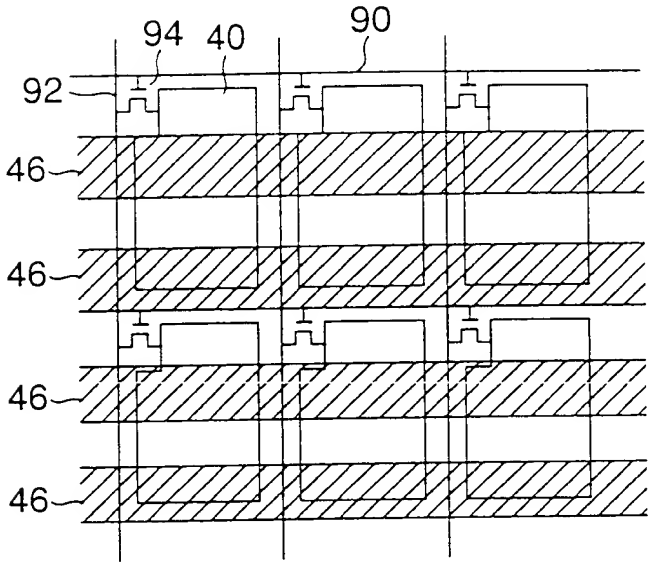

FIG.26

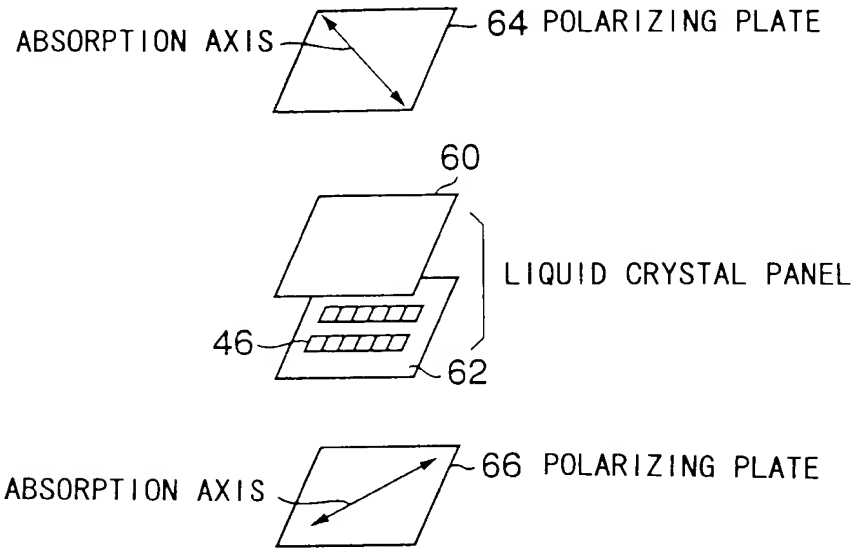
ABSORPTION AXIS
64 POLARIZING PLATE
60
LIQUID CRYSTAL PANEL
46
62
ABSORPTION AXIS
66 POLARIZING PLATE

FIG.27

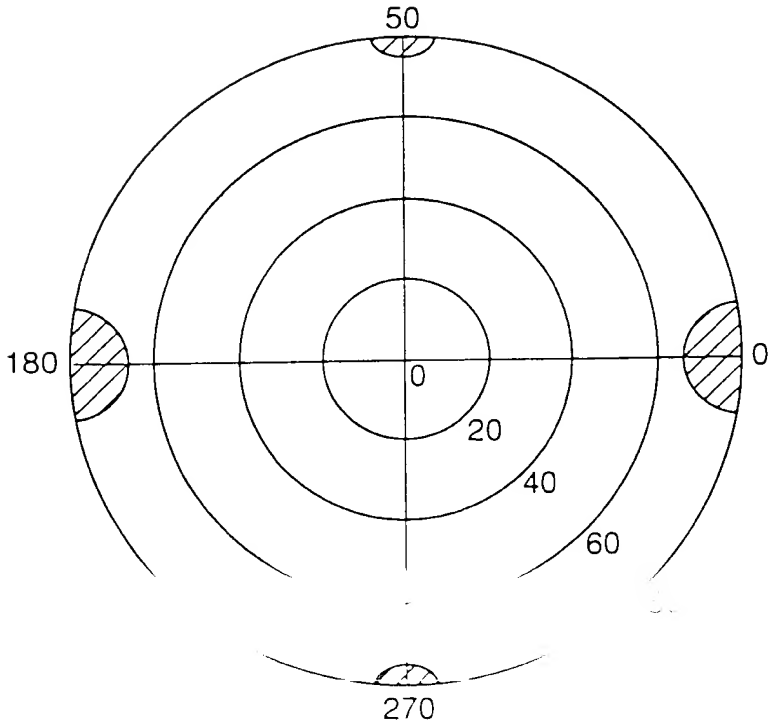
50
180
0
0
20
40
60
270

FIG.28